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METROPOLITAN COMMUNITY COLLEGE

MCC - Longview

Structural Calculations
Project No. 21004

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12-17-2021

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December 17, 2021

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I. – GENERAL INFORMATION

Structural Design Narrative for

MCC - Longview Exhaust Fan Replacement

Metropolitan Community College

Lee's Summit, Missouri

December 13, 2021

Project Overview

This project consists of the replacement of three scientific lab exhaust fans. The new fans are significantly larger than the existing fans, requiring additional structural supports. A steel frame will be designed for each fan to distribute the load into the main building columns.

Design Criteria

All design and construction work will conform to the following:

- International Building Code 2018.
- International Existing Building Code 2018
- Minimum Design Loads for Buildings and Other Structures (ASCE/SEI 7-16)
- Specification for Structural Steel Buildings, American Institute of Steel Construction ANSI/AISC 360-16

Gravity Loads – The structure will be designed to support minimum gravity loads as prescribed per governing code or per actual material composition and make up:

Lateral Loads – It is assumed that wind loads will govern the design. The structure will be designed to resist lateral loads due to wind effects per the International Building Code.

Building Risk Category:	III
Wind Load:	
Basic Wind Speed	117
Exposure Category	C

II. – LOADS

Hazards by Location

Search Information

Address: 500 SW Longview Rd, Lee's Summit, MO 64081, USA

Coordinates: 38.9092838, -94.45354739999999

Elevation: 976 ft

Timestamp: 2021-12-08T16:52:19.580Z

Hazard Type: Wind

ASCE 7-16

MRI 10-Year	76 mph
MRI 25-Year	83 mph
MRI 50-Year	88 mph
MRI 100-Year	94 mph
Risk Category I	103 mph
Risk Category II	109 mph
Risk Category III	117 mph
Risk Category IV	122 mph

ASCE 7-10

MRI 10-Year	76 mph
MRI 25-Year	84 mph
MRI 50-Year	90 mph
MRI 100-Year	96 mph
Risk Category I	105 mph
Risk Category II	115 mph
Risk Category III-IV	120 mph

ASCE 7-05

ASCE 7-05 Wind Speed	90 mph

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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Hazards by Location

Search Information

Address: 500 SW Longview Rd, Lee's Summit, MO 64081, USA

Coordinates: 38.9092838, -94.45354739999999

Elevation: 976 ft

Timestamp: 2021-12-08T16:55:19.803Z

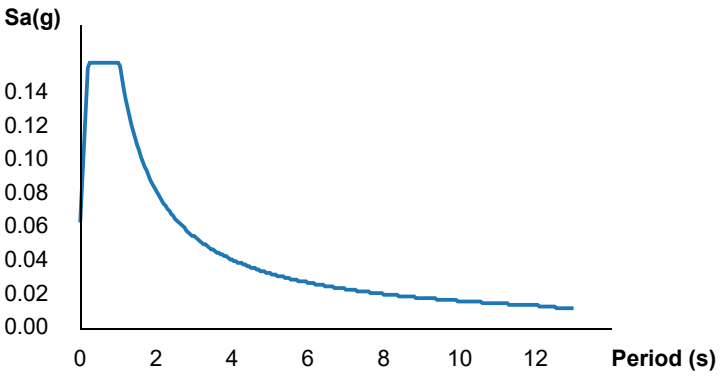
Hazard Type: Seismic

Reference Document: ASCE7-16

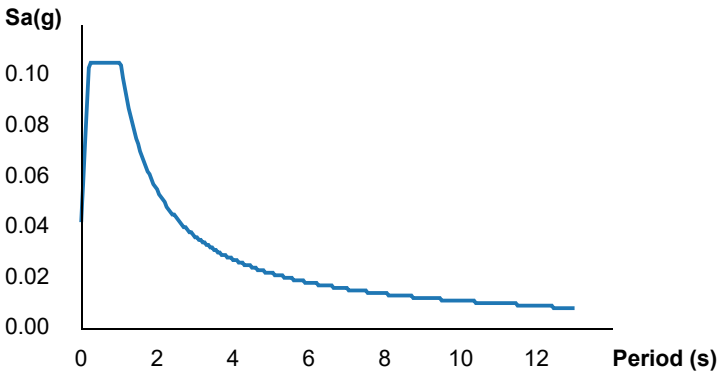
Risk Category: III

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.099	MCE_R ground motion (period=0.2s)
S_1	0.068	MCE_R ground motion (period=1.0s)
S_{MS}	0.158	Site-modified spectral acceleration value
S_{M1}	0.164	Site-modified spectral acceleration value
S_{DS}	0.105	Numeric seismic design value at 0.2s SA
S_{D1}	0.109	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	B	Seismic design category
F_a	1.6	Site amplification factor at 0.2s
F_v	2.4	Site amplification factor at 1.0s

CR_S	0.927	Coefficient of risk (0.2s)
CR_1	0.877	Coefficient of risk (1.0s)
PGA	0.047	MCE_G peak ground acceleration
F_{PGA}	1.6	Site amplification factor at PGA
PGA_M	0.075	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	0.099	Probabilistic risk-targeted ground motion (0.2s)
SsUH	0.107	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.068	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.078	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.5	Factored deterministic acceleration value (PGA)

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

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MARK: ROOM 205
PROJECT: LONGVIEW COLLEGE REVISED
DATE: 9/21/2021

Dimensions

TCNHBLE

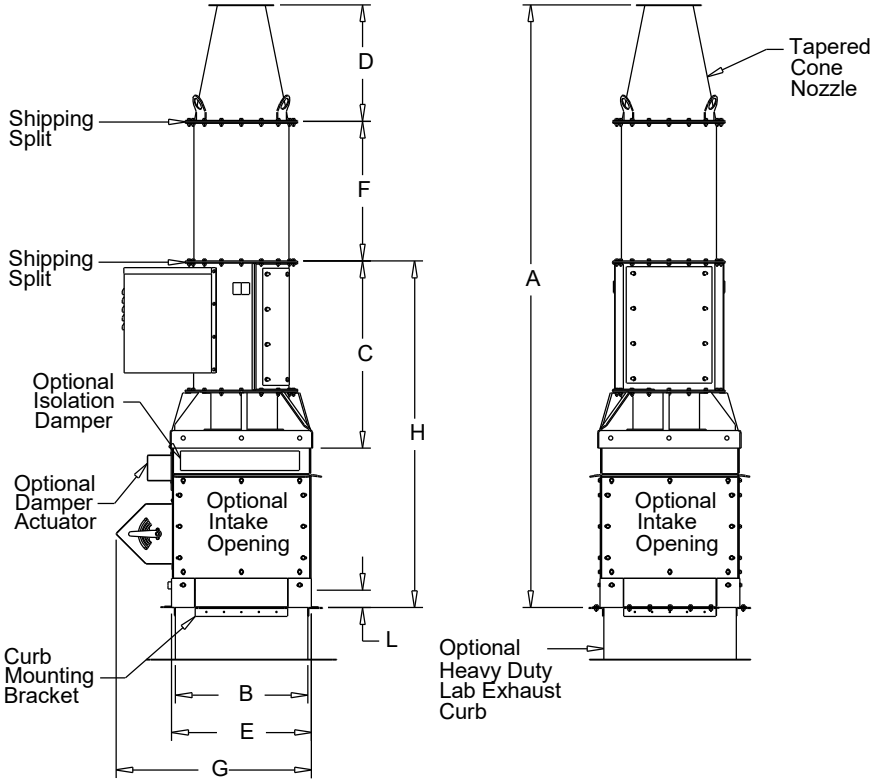
Tubular Centrifugal Inline Upblast Roof Mounted Arrangement 9 With Mixing Box

Dimensions (inches)

Model	195TCNHBLE14
A	120
B	40-7/8
C	42-3/4
D	39
E	41-1/2
F	5-1/8
G	54
H	75-7/8
L	3
*System Weight	1,907 (lbs)

*Estimated Weight - includes fan motor and accessories.

Wind Load Area: 120"*41.5" = 4980in^2 = 34.58ft^2



Wind Load

qz = 0.00256*Kz*Kzt*Kd*V^2

Exposure Category (Section 26.7): C
Height: 50ft

Velocity Pressure Exposure Coefficient (Table 27.3-1): Kz = 1.09
Topographic Factor (Section 26.8): Kzt = 1.0
Wind Directionality Factor, Roof Top Equipment (Table 26.6-1): Kd = 0.85
Basic Wind Speed: 117 mph

qz = 0.00256*1.09*1.0*0.85*117^2 = 32.47 psf

WL = 32.47psf * 34.58ft^2 = 1122.81 lb -> 1.2kip

Load Development

DEAD: 2000 lb = 2 kip

WIND: 1.2 kip

III. – EXHAUST FAN SUPPORT FRAME

Model Settings

Solution

Members

Number of Reported Sections	5
Number of Internal Sections	100
Member Area Load Mesh Size (in^2)	144
Consider Shear Deformation	Yes
Consider Torsional Warping	Yes

Wall Panels

Approximate Mesh Size (in)	24
Transfer Forces Between Intersecting Wood Walls	Yes
Increase Wood Wall Nailing Capacity for Wind Loads	Yes
Include P-Delta for Walls	Yes
Optimize Masonry and Wood Walls	Yes
Maximum Number of Iterations	3

Processor Core Utilization

Single	No
Multiple (Optimum)	Yes
Maximum	No

Axis

Vertical Global Axis

Global Axis corresponding to vertical direction	Y
Convert Existing Data	Yes

Default Member Orientation

Default Global Plane for z-axis	XZ

Plate Axis

Plate Local Axis Orientation	Global

Codes

Hot Rolled Steel	AISC 15th (360-16): ASD
Stiffness Adjustment	Yes (Iterative)
Notional Annex	None
Connections	AISC 14th (360-10): ASD
Cold Formed Steel	AISI S100-16: ASD
Stiffness Adjustment	Yes (Iterative)
Wood	AWC NDS-18: ASD
Temperature	< 100F
Concrete	ACI 318-19
Masonry	TMS 402-16: ASD
Aluminum	AA ADM1-15: ASD
Structure Type	Building
Stiffness Adjustment	Yes (Iterative)
Stainless	AISC 14th (360-10): ASD
Stiffness Adjustment	Yes (Iterative)

Concrete

Compression Stress Block	Rectangular Stress Block
Analyze using Cracked Sections	Yes
Leave room for horizontal rebar splices (2*d bar spacing)	No

Model Settings (Continued)

List forces which were ignored for design in the Detail Report	Yes

Rebar

Column Min Steel	1
Column Max Steel	8
Rebar Material Spec	ASTM A615
Warn if beam-column framing arrangement is not understood	No

Shear Reinforcement

Number of Shear Regions	4
Region 2 & 3 Spacing Increase Increment (in)	4

Seismic

RISA-3D Seismic Load Options

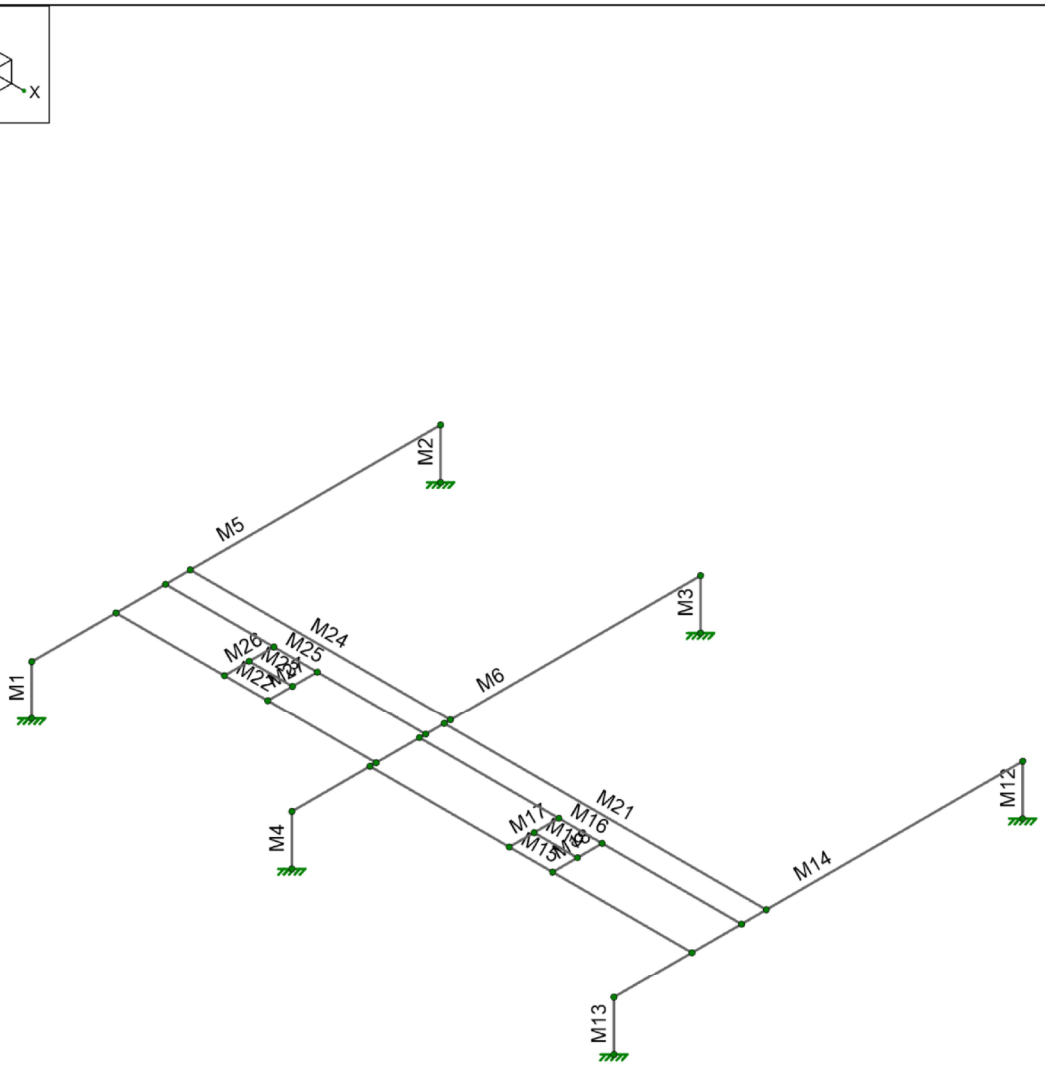
Code	ASCE 7-16
Risk Category	I or II
Drift Cat	Other
Base Elevation (ft)	
Include the weight of the structure in base shear calcs	Yes

Site Parameters

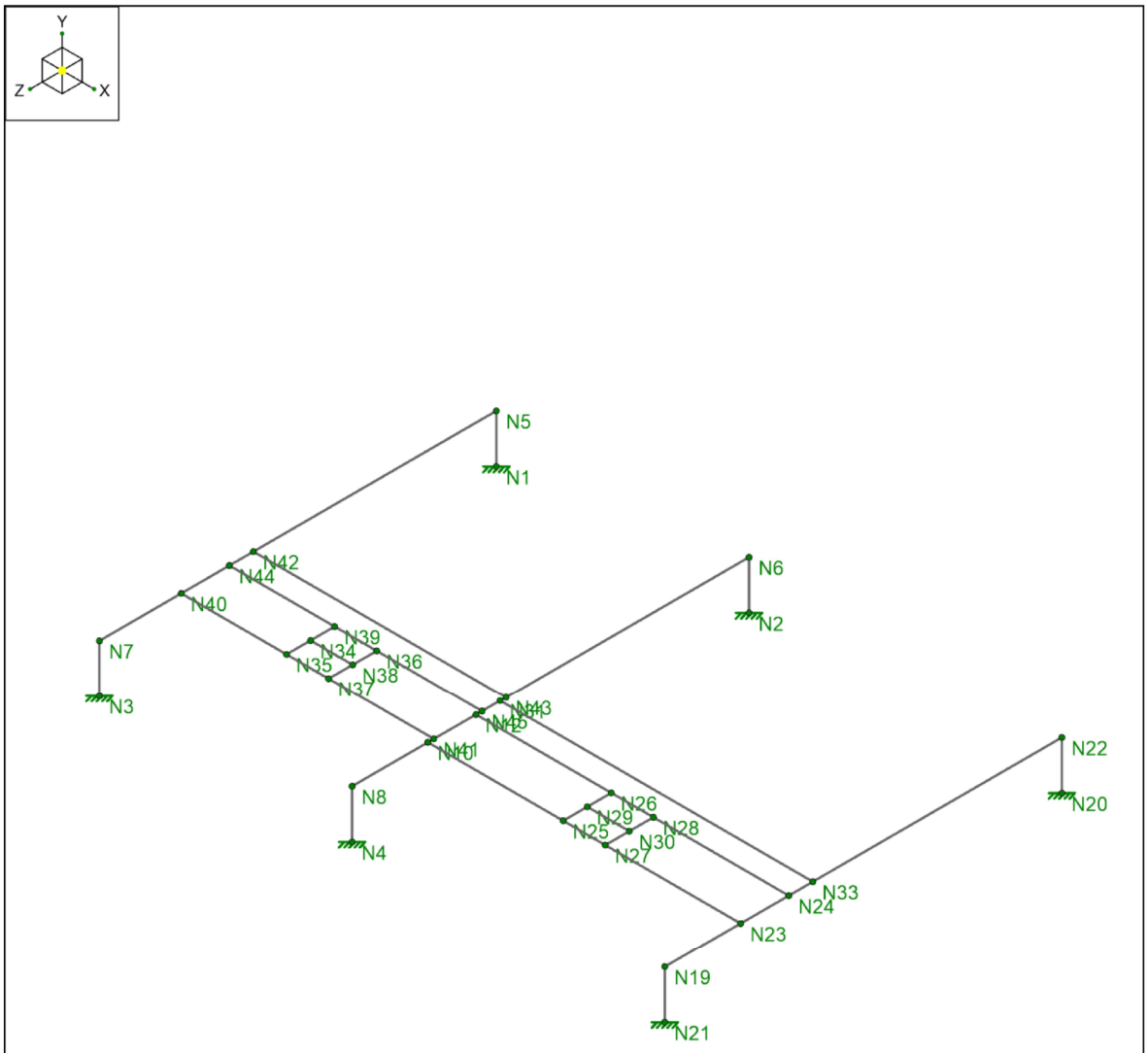
S_1 (g)	1
SD_1 (g)	1
SD_S (g)	1
T_L (sec)	5

Structure Characteristics

T Z (sec)	
T X (sec)	
C_tX	0.02
C_tExp. Z	0.75
C_tExp. X	0.75
R Z	3
R X	3
Ω_0Z	1
Ω_0X	1
C_dZ	4
C_dX	4
ρ Z	1
ρ X	1



Hollis + Miller	MCC Longview Exhaust Fan	SK-1
H. Jones		Dec 17, 2021
21004		Support Frame Model.r3d



Hollis + Miller	MCC Longview Exhaust Fan	SK-2
H. Jones		Dec 17, 2021
21004		Support Frame Model.r3d

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B RECT	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A500 Gr.C RND	29000	11154	0.3	0.65	0.527	46	1.4	62	1.3
7	A500 Gr.C RECT	29000	11154	0.3	0.65	0.527	50	1.4	62	1.3
8	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
9	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
10	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	MAINBM	W14X26	Beam	Wide Flange	A992	Typical	7.69	8.91	245	0.358
2	INTBM	W8X21	Beam	Wide Flange	A992	Typical	6.16	9.77	75.3	0.282
3	COL	HSS4X4X4	Column	Tube	A992	Typical	3.37	7.8	7.8	12.8

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	21	0	0	
3	N3	0	0	33	
4	N4	21	0	33	
5	N5	0	4	0	
6	N6	21	4	0	
7	N7	0	4	33	
8	N8	21	4	33	
9	N10	21	4	26.6979	
10	N12	21	4	22.6979	
11	N19	47	4	33	
12	N20	47	0	0	
13	N21	47	0	33	
14	N22	47	4	0	
15	N23	47	4	26.6979	
16	N24	47	4	22.6979	
17	N25	32.25	4	26.6979	
18	N26	32.25	4	22.6979	
19	N27	35.75	4	26.6979	
20	N28	35.75	4	22.6979	
21	N29	32.25	4	24.6979	
22	N30	35.75	4	24.6979	
23	N31	21	4	20.6979	
24	N33	47	4	20.6979	
25	N34	8.75	4	24.1979	
26	N35	8.75	4	26.1979	
27	N36	12.25	4	22.1979	
28	N37	12.25	4	26.1979	
29	N38	12.25	4	24.1979	
30	N39	8.75	4	22.1979	
31	N40	0	4	26.1979	
32	N41	21	4	26.1979	
33	N42	0	4	20.1979	

Node Coordinates (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
34	N43	21	4	20.1979	
35	N44	0	4	22.1979	
36	N45	21	4	22.1979	

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N3	N7	COL	Column	Tube	A992	Typical
2	M2	N1	N5	COL	Column	Tube	A992	Typical
3	M3	N2	N6	COL	Column	Tube	A992	Typical
4	M4	N4	N8	COL	Column	Tube	A992	Typical
5	M5	N7	N5	MAINBM	Beam	Wide Flange	A992	Typical
6	M6	N8	N6	MAINBM	Beam	Wide Flange	A992	Typical
7	M12	N20	N22	COL	Column	Tube	A992	Typical
8	M13	N21	N19	COL	Column	Tube	A992	Typical
9	M14	N19	N22	MAINBM	Beam	Wide Flange	A992	Typical
10	M15	N10	N23	INTBM	Beam	Wide Flange	A992	Typical
11	M16	N12	N24	INTBM	Beam	Wide Flange	A992	Typical
12	M17	N25	N26	INTBM	Beam	Wide Flange	A992	Typical
13	M18	N27	N28	INTBM	Beam	Wide Flange	A992	Typical
14	M19	N29	N30	RIGID	None	None	RIGID	Typical
15	M21	N31	N33	INTBM	Beam	Wide Flange	A992	Typical
16	M22	N40	N41	INTBM	Beam	Wide Flange	A992	Typical
17	M23	N38	N34	RIGID	None	None	RIGID	Typical
18	M24	N42	N43	INTBM	Beam	Wide Flange	A992	Typical
19	M25	N44	N45	INTBM	Beam	Wide Flange	A992	Typical
20	M26	N35	N39	INTBM	Beam	Wide Flange	A992	Typical
21	M27	N37	N36	INTBM	Beam	Wide Flange	A992	Typical

Design Size and Code Check Parameters

	Label	Max Axial/Bending Chk	Max Shear Chk
1	Typical	1	1

Deflection Design

	Label	LC	Ratio	LC	Ratio	LC	Ratio
1	Typical	1	240	2	240	3	240

Basic Load Cases

	BLC Description	Category	Y Gravity	Point
1	DEAD	DL	-1	1
2	WIND X	WLX		1
3	WIND Z	WLZ		1

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor
1	D	Yes	Y	DL	1		
2	D+0.6W	Yes	Y	DL	1	WL	0.6
3	0.6D+0.6W	Yes	Y	DL	0.6	WL	0.6

Member Point Loads (BLC 1 : DEAD)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M19	Y	-2	%50

Member Point Loads (BLC 2 : WIND X)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M19	Mx	6	%50

Member Point Loads (BLC 3 : WIND Z)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M19	Mz	-6	%50

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	0	2	0.696	2	0.595	2	0.805	2	0.002	2	0.002	2
2		min	0	3	0.418	3	0.357	3	0.482	3	0.001	3	0.001	3
3	N2	max	0	2	1.216	2	1.351	2	1.883	2	0.002	2	0	3
4		min	0	3	0.729	3	0.81	3	1.128	3	0.001	3	-0.001	1
5	N4	max	0.003	2	2.45	2	-0.819	3	-0.963	3	-0.003	3	0.017	2
6		min	0.002	3	1.47	3	-1.368	1	-1.606	1	-0.006	1	0.01	3
7	N3	max	0	3	0.968	2	-0.351	3	-0.426	3	-0.001	3	0.011	2
8		min	-0.001	1	0.581	3	-0.585	1	-0.711	1	-0.001	1	0.006	3
9	N20	max	0	2	0.976	2	1.023	2	1.424	2	0.001	2	-0.002	3
10		min	0	3	0.586	3	0.613	3	0.853	3	0.001	3	-0.004	1
11	N21	max	-0.002	3	1.851	2	-0.609	3	-0.714	3	0.005	2	-0.011	3
12		min	-0.003	1	1.111	3	-1.016	1	-1.191	1	0.003	3	-0.019	1
13	Totals:	max	0	2	8.157	2	0	2						
14		min	0	3	4.894	3	0	3						

Envelope Node Displacements

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	N1	max	0	3	0	3	0	3	0	3	0	3	0	3
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N2	max	0	3	0	3	0	3	0	3	0	3	0	2
4		min	0	1	0	1	0	1	0	1	0	1	0	3
5	N3	max	0	2	0	3	0	2	0	2	0	2	0	3
6		min	0	3	0	1	0	3	0	3	0	3	0	1
7	N4	max	0	3	0	3	0	2	0	2	0	2	0	3
8		min	0	1	0	1	0	3	0	3	0	3	0	1
9	N5	max	0	2	0	3	-0.001	3	1.228e-3	2	-5.027e-6	3	-4.428e-6	3
10		min	0	3	0	1	-0.002	1	7.366e-4	3	-8.421e-6	1	-7.406e-6	1
11	N6	max	0	3	0	3	-0.006	3	2.612e-3	2	-4.831e-6	3	3.179e-7	2
12		min	0	1	-0.001	1	-0.01	1	1.565e-3	3	-8.095e-6	1	2.065e-7	3
13	N7	max	0.001	2	0	3	-0.002	3	-8.782e-4	3	4.57e-6	2	-1.715e-5	3
14		min	0	3	-0.001	1	-0.004	1	-1.465e-3	1	2.705e-6	3	-2.868e-5	1
15	N8	max	0.002	2	-0.001	3	-0.008	3	-2.15e-3	3	2.235e-5	2	-4.129e-5	3
16		min	0.001	3	-0.001	1	-0.013	1	-3.589e-3	1	1.33e-5	3	-6.911e-5	1
17	N10	max	0	3	-0.162	3	-0.007	3	-1.809e-3	3	9.547e-6	2	-2.69e-3	3
18		min	0	1	-0.271	1	-0.012	1	-3.02e-3	1	5.69e-6	3	-4.483e-3	1
19	N12	max	0	3	-0.232	3	-0.007	3	-1.015e-3	3	1.401e-5	2	-2.604e-3	3
20		min	-0.001	1	-0.387	1	-0.012	1	-1.695e-3	1	8.375e-6	3	-4.338e-3	1

Envelope Node Displacements (Continued)

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
21	N19	max	-0.001	3	-0.001	3	-0.006	3	-1.601e-3	3	-1.284e-5	3	7.758e-5	2
22		min	-0.002	1	-0.001	1	-0.01	1	-2.671e-3	1	-2.148e-5	1	4.637e-5	3
23	N20	max	0	3	0	3	0	3	0	3	0	3	0	2
24		min	0	1	0	1	0	1	0	1	0	1	0	3
25	N21	max	0	2	0	3	0	2	0	2	0	3	0	2
26		min	0	3	0	1	0	3	0	3	0	1	0	3
27	N22	max	0	3	0	3	-0.004	3	1.978e-3	2	-3.588e-6	3	1.123e-5	2
28		min	0	1	-0.001	1	-0.007	1	1.185e-3	3	-6.014e-6	1	6.723e-6	3
29	N23	max	0	3	-0.121	3	-0.006	3	-1.346e-3	3	-3.025e-6	3	5.006e-3	2
30		min	0	1	-0.201	1	-0.009	1	-2.246e-3	1	-5.063e-6	1	3.003e-3	3
31	N24	max	0	3	-0.173	3	-0.005	3	-7.602e-4	3	1.272e-5	2	5.121e-3	2
32		min	-0.001	1	-0.288	1	-0.009	1	-1.268e-3	1	7.6e-6	3	3.072e-3	3
33	N25	max	0	3	-0.432	3	-0.006	3	-1.311e-3	3	9.107e-6	2	-5.209e-4	3
34		min	0	1	-0.721	1	-0.011	1	-2.187e-3	1	5.444e-6	3	-8.676e-4	1
35	N26	max	0	3	-0.493	3	-0.006	3	-1.206e-3	3	9.188e-6	2	-4.946e-4	3
36		min	-0.001	1	-0.822	1	-0.011	1	-2.013e-3	1	5.491e-6	3	-8.236e-4	1
37	N27	max	0	3	-0.427	3	-0.007	3	-1.297e-3	3	9.413e-6	2	1.313e-3	2
38		min	0	1	-0.711	1	-0.011	1	-2.164e-3	1	5.626e-6	3	7.874e-4	3
39	N28	max	0	3	-0.486	3	-0.007	3	-1.192e-3	3	7.894e-6	2	1.353e-3	2
40		min	-0.001	1	-0.811	1	-0.011	1	-1.989e-3	1	4.718e-6	3	8.112e-4	3
41	N29	max	0	3	-0.464	3	-0.006	3	-1.252e-3	3	1.074e-5	2	2.421e-4	2
42		min	0	1	-0.773	1	-0.011	1	-2.088e-3	1	6.418e-6	3	1.448e-4	3
43	N30	max	0	3	-0.458	3	-0.007	3	-1.252e-3	3	1.074e-5	2	2.421e-4	2
44		min	0	1	-0.763	1	-0.011	1	-2.088e-3	1	6.418e-6	3	1.448e-4	3
45	N31	max	-0.001	3	-0.251	3	-0.007	3	-5.558e-4	3	1.32e-5	2	-5.421e-4	3
46		min	-0.001	1	-0.418	1	-0.012	1	-9.279e-4	1	7.889e-6	3	-9.028e-4	1
47	N33	max	-0.001	3	-0.187	3	-0.005	3	-4.222e-4	3	1.219e-5	2	1.632e-3	2
48		min	-0.001	1	-0.312	1	-0.009	1	-7.044e-4	1	7.287e-6	3	9.784e-4	3
49	N34	max	0	3	-0.17	3	-0.004	3	-9.973e-4	3	1.775e-5	2	-4.581e-4	3
50		min	-0.001	1	-0.284	1	-0.007	1	-1.664e-3	1	1.061e-5	3	-7.651e-4	1
51	N35	max	0	3	-0.147	3	-0.004	3	-9.794e-4	3	1.944e-5	2	-5.355e-4	3
52		min	0	1	-0.245	1	-0.007	1	-1.634e-3	1	1.163e-5	3	-8.941e-4	1
53	N36	max	-0.001	3	-0.214	3	-0.005	3	-1.015e-3	3	1.875e-5	2	-3.806e-4	3
54		min	-0.001	1	-0.357	1	-0.008	1	-1.694e-3	1	1.121e-5	3	-6.36e-4	1
55	N37	max	0	3	-0.165	3	-0.005	3	-1.021e-3	3	1.989e-5	2	-3.108e-4	3
56		min	0	1	-0.275	1	-0.008	1	-1.704e-3	1	1.189e-5	3	-5.195e-4	1
57	N38	max	0	3	-0.189	3	-0.005	3	-9.973e-4	3	1.775e-5	2	-4.581e-4	3
58		min	-0.001	1	-0.316	1	-0.008	1	-1.664e-3	1	1.061e-5	3	-7.651e-4	1
59	N39	max	-0.001	3	-0.194	3	-0.004	3	-9.737e-4	3	1.995e-5	2	-6.104e-4	3
60		min	-0.001	1	-0.323	1	-0.007	1	-1.625e-3	1	1.193e-5	3	-1.019e-3	1
61	N40	max	0	3	-0.072	3	-0.002	3	-7.431e-4	3	2.197e-5	2	-8.129e-4	3
62		min	0	1	-0.119	1	-0.003	1	-1.239e-3	1	1.313e-5	3	-1.356e-3	1
63	N41	max	0	3	-0.173	3	-0.007	3	-1.724e-3	3	1.46e-5	2	2.926e-6	2
64		min	0	1	-0.289	1	-0.012	1	-2.878e-3	1	8.719e-6	3	2.456e-6	3
65	N42	max	-0.001	3	-0.109	3	-0.002	3	-2.505e-4	3	1.367e-5	2	-9.66e-4	3
66		min	-0.001	1	-0.182	1	-0.003	1	-4.178e-4	1	8.171e-6	3	-1.612e-3	1
67	N43	max	-0.001	3	-0.254	3	-0.007	3	-4.424e-4	3	1.49e-5	2	-1.895e-4	3
68		min	-0.001	1	-0.423	1	-0.012	1	-7.386e-4	1	8.906e-6	3	-3.177e-4	1
69	N44	max	-0.001	3	-0.101	3	-0.002	3	-4.363e-4	3	1.929e-5	2	-1.026e-3	3
70		min	-0.001	1	-0.168	1	-0.003	1	-7.277e-4	1	1.154e-5	3	-1.712e-3	1
71	N45	max	-0.001	3	-0.238	3	-0.007	3	-9.003e-4	3	1.861e-5	2	-1.786e-4	3
72		min	-0.001	1	-0.397	1	-0.012	1	-1.503e-3	1	1.112e-5	3	-2.995e-4	1

Envelope Member End Reactions

	Member	Member End		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
1	M1	I	max	0.968	2	0.001	2	-0.351	3	-0.001	3	0.711	2	0.011	2
2			min	0.581	3	0	3	-0.585	1	-0.001	1	0.426	3	0.006	3
3		J	max	0.922	2	0.001	2	-0.351	3	-0.001	3	-0.978	3	0.007	2
4			min	0.553	3	0	3	-0.585	1	-0.001	1	-1.631	1	0.004	3
5	M2	I	max	0.696	2	0	3	0.595	2	0.002	2	-0.482	3	0.002	2
6			min	0.418	3	0	1	0.357	3	0.001	3	-0.805	1	0.001	3
7		J	max	0.65	2	0	3	0.595	2	0.002	2	1.577	2	0.003	2
8			min	0.39	3	0	1	0.357	3	0.001	3	0.945	3	0.002	3
9	M3	I	max	1.216	2	0	3	1.352	2	0.002	2	-1.128	3	0	3
10			min	0.729	3	0	1	0.81	3	0.001	3	-1.883	1	-0.001	1
11		J	max	1.17	2	0	3	1.352	2	0.002	2	3.524	2	0.001	2
12			min	0.702	3	0	1	0.81	3	0.001	3	2.111	3	0	3
13	M4	I	max	2.45	2	-0.002	3	-0.819	3	-0.003	3	1.606	2	0.017	2
14			min	1.47	3	-0.003	1	-1.367	1	-0.006	1	0.963	3	0.01	3
15		J	max	2.404	2	-0.002	3	-0.819	3	-0.003	3	-2.314	3	0.027	2
16			min	1.442	3	-0.003	1	-1.367	1	-0.006	1	-3.861	1	0.016	3
17	M5	I	max	0.585	2	0.923	2	0	3	-0.004	3	-0.001	3	1.631	2
18			min	0.351	3	0.554	3	-0.001	1	-0.007	1	-0.001	1	0.978	3
19		J	max	0.595	2	-0.39	3	0	3	0.003	2	-0.001	3	1.577	2
20			min	0.357	3	-0.651	1	0	1	0.002	3	-0.002	1	0.945	3
21	M6	I	max	1.368	2	2.412	2	0.003	2	-0.016	3	-0.003	3	3.861	2
22			min	0.819	3	1.445	3	0.002	3	-0.027	1	-0.006	1	2.314	3
23		J	max	1.351	2	-0.703	3	0	3	0.001	2	-0.001	3	3.524	2
24			min	0.81	3	-1.173	1	0	1	0	3	-0.002	1	2.111	3
25	M12	I	max	0.976	2	0	3	1.023	2	0.001	2	-0.853	3	-0.002	3
26			min	0.586	3	0	1	0.613	3	0.001	3	-1.424	1	-0.004	1
27		J	max	0.93	2	0	3	1.023	2	0.001	2	2.667	2	-0.002	3
28			min	0.558	3	0	1	0.613	3	0.001	3	1.598	3	-0.003	1
29	M13	I	max	1.851	2	0.003	2	-0.609	3	0.005	2	1.191	2	-0.011	3
30			min	1.111	3	0.002	3	-1.015	1	0.003	3	0.714	3	-0.019	1
31		J	max	1.805	2	0.003	2	-0.609	3	0.005	2	-1.72	3	-0.018	3
32			min	1.083	3	0.002	3	-1.015	1	0.003	3	-2.869	1	-0.03	1
33	M14	I	max	1.016	2	1.81	2	-0.002	3	0.03	2	0.005	2	2.869	2
34			min	0.609	3	1.085	3	-0.003	1	0.018	3	0.003	3	1.72	3
35		J	max	1.023	2	-0.559	3	0	3	-0.002	3	-0.001	3	2.667	2
36			min	0.613	3	-0.933	1	0	1	-0.003	1	-0.001	1	1.598	3
37	M15	I	max	0.035	2	0.837	2	-0.002	3	-0.001	3	0.018	2	0.369	2
38			min	0.021	3	0.502	3	-0.003	1	-0.002	1	0.011	3	0.222	3
39		J	max	0.012	2	-0.475	3	-0.001	3	0	2	-0.007	3	0.029	2
40			min	0.007	3	-0.792	1	-0.002	1	0	3	-0.011	1	0.017	3
41	M16	I	max	-0.012	3	0.816	2	-0.002	3	0.001	2	0.018	2	0.356	2
42			min	-0.021	1	0.489	3	-0.003	1	0	3	0.011	3	0.214	3
43		J	max	0.003	2	-0.488	3	-0.002	3	-0.001	3	-0.013	3	0.068	2
44			min	0.002	3	-0.813	1	-0.004	1	-0.002	1	-0.022	1	0.041	3
45	M17	I	max	0.005	2	0.613	2	0.013	2	0.103	2	-0.008	3	-0.001	3
46			min	0.003	3	0.368	3	0.007	3	0.062	3	-0.014	1	-0.002	1
47		J	max	-0.004	3	-0.283	3	0.01	2	-0.059	3	0.012	2	-0.001	3
48			min	-0.006	1	-0.471	1	0.006	3	-0.099	1	0.007	3	-0.001	1
49	M18	I	max	-0.003	3	0.471	2	0.011	2	-0.06	3	-0.007	3	0	3
50			min	-0.005	1	0.282	3	0.006	3	-0.099	1	-0.012	1	0	1
51		J	max	0.007	2	-0.368	3	0.013	2	0.103	2	0.015	2	-0.001	3
52			min	0.004	3	-0.613	1	0.008	3	0.062	3	0.009	3	-0.002	1
53	M19	I	max	0.002	2	1	2	-0.007	3	-0.171	3	0.02	2	-0.121	3
54			min	0.001	3	0.6	3	-0.012	1	-0.286	1	0.012	3	-0.202	1
55		J	max	0.002	2	-0.6	3	-0.007	3	-0.171	3	-0.012	3	-0.121	3

Envelope Member End Reactions (Continued)

	Member	Member End		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
56			min	0.001	3	-1	1	-0.012	1	-0.286	1	-0.02	1	-0.202	1
57	M21	I	max	-0.007	3	0.277	2	0	3	0	3	0.008	2	0.06	2
58			min	-0.012	1	0.166	3	-0.001	1	0	1	0.005	3	0.036	3
59		J	max	-0.007	3	-0.161	3	0	3	0	3	-0.005	3	-0.038	3
60			min	-0.012	1	-0.268	1	-0.001	1	0	1	-0.008	1	-0.064	1
61	M22	I	max	0.005	2	0.209	2	0.004	2	0.001	2	-0.011	3	0.004	2
62			min	0.003	3	0.125	3	0.002	3	0.001	3	-0.018	1	0.002	3
63		J	max	0.032	2	-0.189	3	0.005	2	0.004	2	0.023	2	0.39	2
64			min	0.019	3	-0.316	1	0.003	3	0.002	3	0.014	3	0.234	3
65	M23	I	max	0.002	2	0	2	0.014	2	0.836	2	-0.015	3	-0.021	3
66			min	0.001	3	0	3	0.008	3	0.501	3	-0.025	1	-0.035	1
67		J	max	0.002	2	0	2	0.014	2	0.836	2	0.024	2	-0.021	3
68			min	0.001	3	0	3	0.008	3	0.501	3	0.015	3	-0.036	1
69	M24	I	max	-0.004	3	0.218	2	0.001	2	0	2	-0.005	3	0.001	2
70			min	-0.007	1	0.131	3	0	3	0	3	-0.009	1	0.001	3
71		J	max	-0.004	3	-0.133	3	0.001	2	0	2	0.008	2	0.044	2
72			min	-0.007	1	-0.222	1	0	3	0	3	0.005	3	0.027	3
73	M25	I	max	0.002	2	0.282	2	0.005	2	0.003	2	-0.013	3	0.005	2
74			min	0.001	3	0.169	3	0.003	3	0.002	3	-0.021	1	0.003	3
75		J	max	-0.015	3	-0.145	3	0.004	2	0	3	0.017	2	0.324	2
76			min	-0.025	1	-0.242	1	0.002	3	-0.001	1	0.01	3	0.194	3
77	M26	I	max	-0.004	3	-0.1	3	-0.008	3	0.012	2	0.014	2	0.001	2
78			min	-0.007	1	-0.166	1	-0.013	1	0.007	3	0.008	3	0	3
79		J	max	0.007	2	-0.15	3	-0.009	3	-0.014	3	-0.01	3	-0.002	3
80			min	0.004	3	-0.25	1	-0.015	1	-0.024	1	-0.016	1	-0.003	1
81	M27	I	max	0.008	2	0.251	2	-0.009	3	-0.014	3	0.016	2	-0.002	3
82			min	0.005	3	0.15	3	-0.015	1	-0.023	1	0.01	3	-0.004	1
83		J	max	-0.004	3	0.167	2	-0.008	3	0.012	2	-0.008	3	-0.001	3
84			min	-0.006	1	0.1	3	-0.013	1	0.007	3	-0.014	1	-0.001	1

Envelope Beam Deflections

	Member Label	Span		Location [ft]	y' [in]	(n) L'/y' Ratio	LC
1	M5	1	max	32.656	-0.003	NC	3
2		1	min	15.469	-0.188	2108	1
3	M6	1	max	32.656	-0.007	NC	3
4		1	min	14.781	-0.431	919	1
5	M14	1	max	32.656	-0.005	NC	3
6		1	min	14.781	-0.321	1232	1
7	M15	1	max	0.271	-0.009	NC	3
8		1	min	13	-0.492	634	1
9	M16	1	max	0.271	-0.009	NC	3
10		1	min	13	-0.49	636	1
11	M17	1	max	0.75	-0.001	NC	2
12		1	min	0	0	NC	1
13	M18	1	max	3.25	-0.001	NC	2
14		1	min	0	0	NC	1
15	M21	1	max	0.271	-0.002	NC	3
16		1	min	13	-0.124	2526	1
17	M22	1	max	20.781	-0.001	NC	3
18		1	min	11.156	-0.058	4348	1
19	M24	1	max	20.781	-0.001	NC	3
20		1	min	10.5	-0.051	4915	1
21	M25	1	max	0.219	-0.001	NC	3
22		1	min	9.625	-0.06	4194	1
23	M26	1	max	4	0	NC	3

Envelope Beam Deflections (Continued)

	Member Label	Span		Location [ft]	y' [in]	(n) L'/y' Ratio	LC
24		1	min	0	0	NC	1
25	M27	1	max	4	0	NC	3
26		1	min	0	0	NC	1

Envelope Beam Deflection Checks

	Beam	Design Rule	Span	Defl [in]	Ratio	LC	Defl [in]	Ratio	LC	Defl [in]	Ratio	LC
1	M5	Typical	1	-0.188	2108	1(DL)	-0.188	2108	2(DL+WL)	-0.113	3517	3(DL+WL)
2	M6	Typical	1	-0.431	919	1(DL)	-0.431	919	2(DL+WL)	-0.258	1535	3(DL+WL)
3	M14	Typical	1	-0.321	1232	1(DL)	-0.321	1232	2(DL+WL)	-0.193	2056	3(DL+WL)
4	M15	Typical	1	-0.492	634	1(DL)	-0.492	634	2(DL+WL)	-0.295	1057	3(DL+WL)
5	M16	Typical	1	-0.49	636	1(DL)	-0.49	636	2(DL+WL)	-0.294	1060	3(DL+WL)
6	M17	Typical	1	0	NC	1(DL)	0	NC	2(DL+WL)	0	NC	3(DL+WL)
7	M18	Typical	1	0	NC	1(DL)	0	NC	2(DL+WL)	0	NC	3(DL+WL)
8	M21	Typical	1	-0.124	2526	1(DL)	-0.124	2526	2(DL+WL)	-0.074	4210	3(DL+WL)
9	M22	Typical	1	-0.058	4348	1(DL)	-0.058	4348	2(DL+WL)	-0.035	7247	3(DL+WL)
10	M24	Typical	1	-0.051	4915	1(DL)	-0.051	4915	2(DL+WL)	-0.031	8192	3(DL+WL)
11	M25	Typical	1	-0.06	4194	1(DL)	-0.06	4194	2(DL+WL)	-0.036	6992	3(DL+WL)
12	M26	Typical	1	0	NC	1(DL)	0	NC	2(DL+WL)	0	NC	3(DL+WL)
13	M27	Typical	1	0	NC	1(DL)	0	NC	2(DL+WL)	0	NC	3(DL+WL)

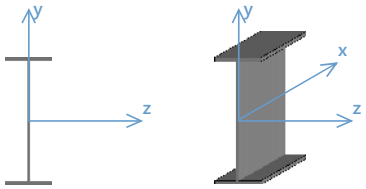
Warning Log

No Data to Print...

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks

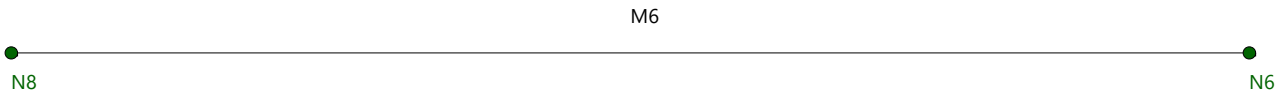
	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
1	M1	HSS4X4X4	0.145	4	2	0.021	4	z	2	93.815	100.898	11.702	11.702	1.134	H1-1b
2	M2	HSS4X4X4	0.138	4	2	0.022	4	z	2	93.815	100.898	11.702	11.702	1.229	H1-1b
3	M3	HSS4X4X4	0.307	4	2	0.049	4	z	2	93.815	100.898	11.702	11.702	2.222	H1-1b
4	M4	HSS4X4X4	0.345	4	2	0.05	4	z	2	93.815	100.898	11.702	11.702	1.177	H1-1b
5	M5	W14X26	0.388	12.719	2	0.015	5.156	y	2	8.54	230.24	13.822	17.646	1.274	H1-1b
6	M6	W14X26	0.916	10.656	2	0.218	10.656	z	2	8.54	230.24	13.822	18.515	1.337	H1-1b
7	M12	HSS4X4X4	0.233	4	2	0.037	4	z	2	93.815	100.898	11.702	11.702	1.119	H1-1b
8	M13	HSS4X4X4	0.257	4	2	0.037	4	z	2	93.815	100.898	11.702	11.702	1.172	H1-1b
9	M14	W14X26	0.676	10.312	2	0.048	12.031	z	2	8.54	230.24	13.822	18.324	1.323	H1-1b
10	M15	W8X21	0.388	11.104	2	0.02	0.542	y	2	15.086	184.431	14.197	19.816	1.235	H1-1b
11	M16	W8X21	0.387	14.896	2	0.02	0	y	2	15.086	184.431	14.197	19.913	1.241	H1-1b
12	M17	W8X21	0.04	0	2	0.029	1.917	y	2	165.846	184.431	14.197	50.898	1.359	H1-1b
13	M18	W8X21	0.04	4	2	0.029	2.083	y	2	165.846	184.431	14.197	50.898	1.36	H1-1b
14	M21	W8X21	0.097	13.271	2	0.007	0	y	2	15.086	184.431	14.197	18.232	1.136	H1-1b
15	M22	W8X21	0.059	12.25	2	0.008	18.594	y	2	23.125	184.431	14.197	27.763	1.354	H1-1b
16	M24	W8X21	0.049	10.281	2	0.005	21	y	2	23.125	184.431	14.197	23.37	1.139	H1-1b
17	M25	W8X21	0.06	8.75	2	0.007	1.75	y	2	23.125	184.431	14.197	28.303	1.38	H1-1b
18	M26	W8X21	0.01	4	2	0.009	2.292	y	2	165.846	184.431	14.197	50.898	1.354	H1-1b
19	M27	W8X21	0.01	2	2	0.009	1.708	y	2	165.846	184.431	14.197	50.898	1.356	H1-1b

Detail Report: M6 **Unity Check:** 0.916 (LC 2) **Load Combination:** Envelope

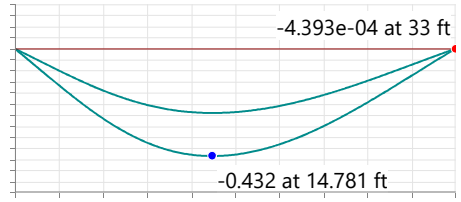


Input Data:

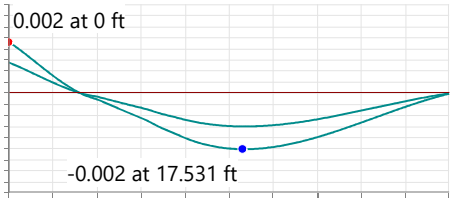
Shape:	W14X26	**I Node:**	N8
Member Type:	Beam	**J Node:**	N6
Length (ft):	33	**I Release:**	Fixed
Material Type:	Hot Rolled Steel	**J Release:**	Fixed
Design Rule:	Typical	**I Offset (in):**	N/A
Number of Internal Sections:	97	**J Offset (in):**	N/A



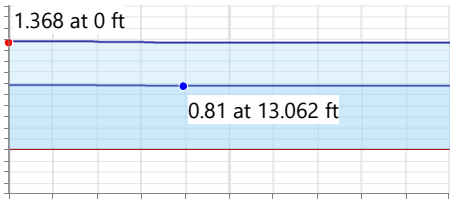
Diagrams:



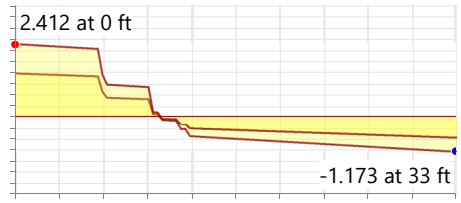
y Deflection (in)



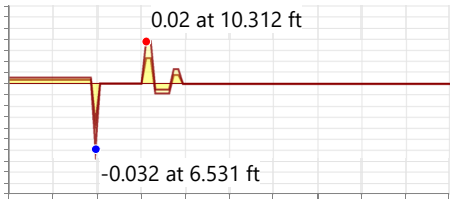
z Deflection (in)



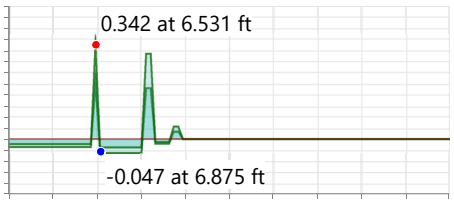
Axial Force (kips)



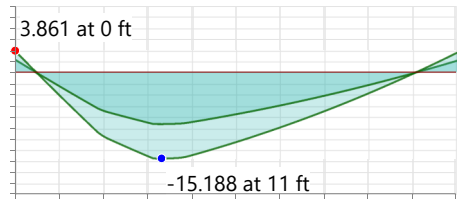
y Shear Force (kips)



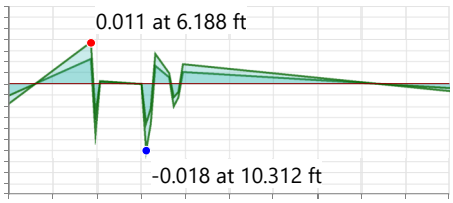
z Shear Force (kips)



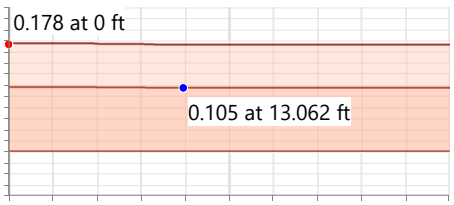
Torsion (kip-ft)



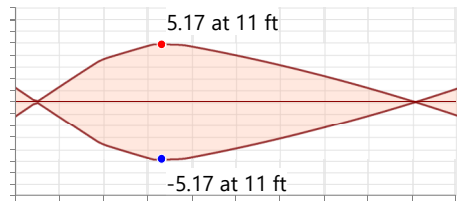
z-z Moment (kip-ft)



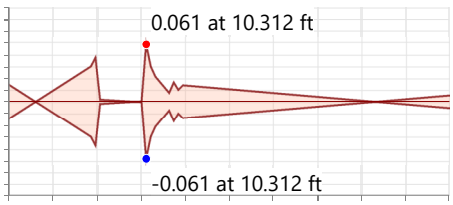
y-y Moment (kip-ft)



Axial Stress (ksi)



Bending Strong Stress (ksi)



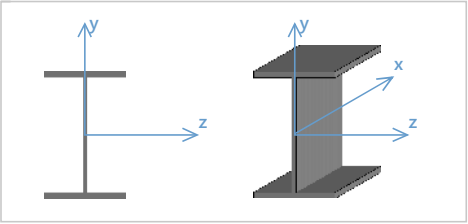
Bending Weak Stress (ksi)

AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	2	-	-	-	-
Applied Loading - Shear + Torsion	2	-	-	-	-
Axial Tension Analysis	2	0.000 k	230.24 k	-	-
Axial Compression Analysis	2	1.357 k	8.54 k	-	-

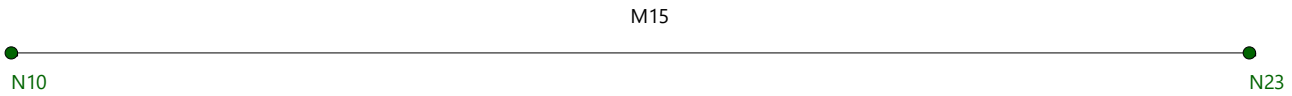
Flexural Analysis (Strong Axis)	2	15.182 k-ft	18.515 k-ft	-	**-**
Flexural Analysis (Weak Axis)	2	0.229 k-ft	13.822 k-ft	-	**-**
Shear Analysis (Major Axis y)	2	13.982 k	70.89 k	0.197	**Pass**
Shear Analysis (Minor Axis z)	2	16.58 k	75.902 k	0.218	**Pass**
Bending & Axial Interaction Check (UC Bending Max)	2	-	-	0.916	**Pass**

Detail Report: M15 **Unity Check:** 0.388 (LC 2) **Load Combination:** Envelope

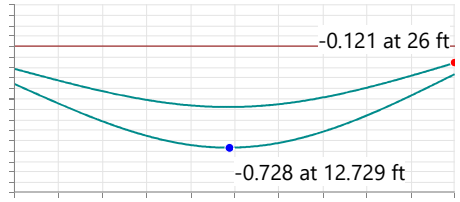


Input Data:

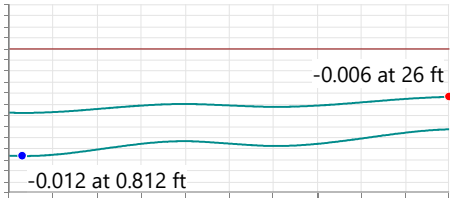
Shape:	W8X21	I Node:	N10
Member Type:	Beam	J Node:	N23
Length (ft):	26	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset (in):	N/A
Number of Internal Sections:	97	J Offset (in):	N/A



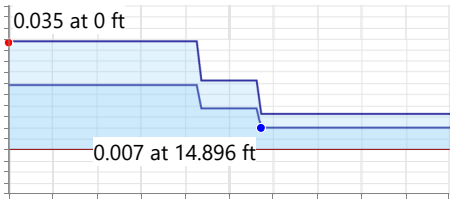
Diagrams:



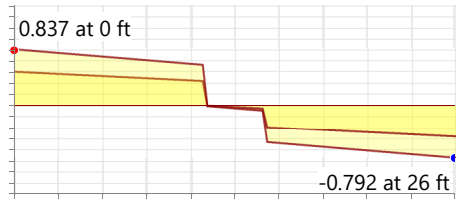
y Deflection (in)



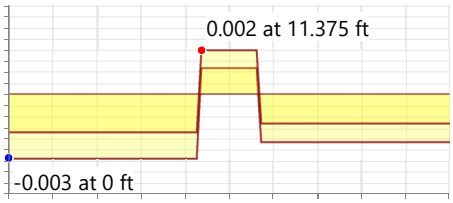
z Deflection (in)



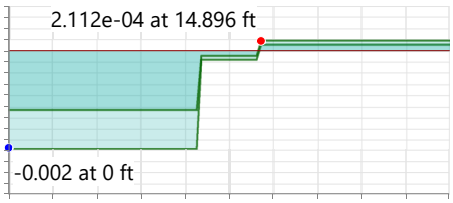
Axial Force (kips)



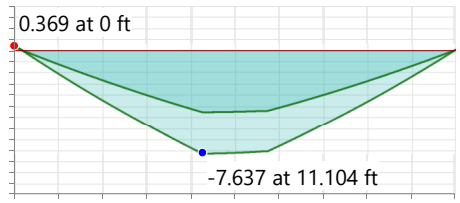
y Shear Force (kips)



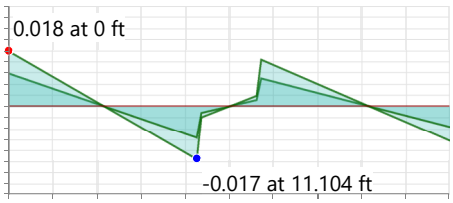
z Shear Force (kips)



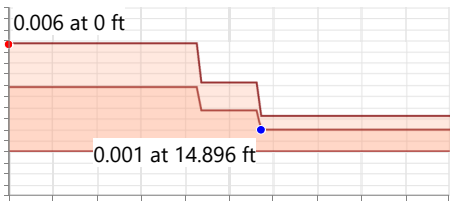
Torsion (kip-ft)



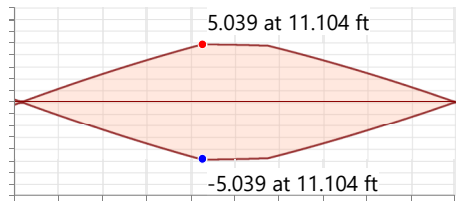
z-z Moment (kip-ft)



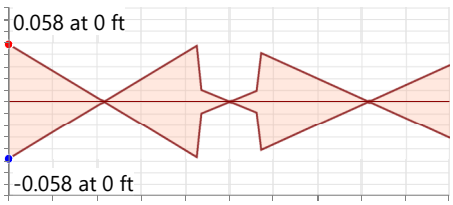
y-y Moment (kip-ft)



Axial Stress (ksi)



Bending Strong Stress (ksi)



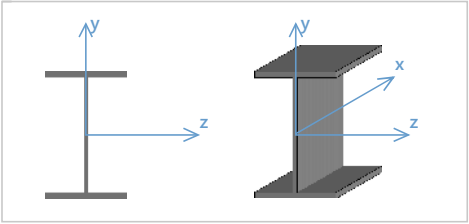
Bending Weak Stress (ksi)

AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	2	-	-	-	-
Applied Loading - Shear + Torsion	2	-	-	-	-
Axial Tension Analysis	2	0.000 k	184.431 k	-	-
Axial Compression Analysis	2	0.035 k	15.086 k	-	-

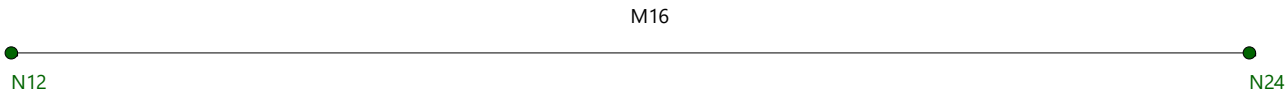
Flexural Analysis (Strong Axis)	2	7.637 k-ft	19.816 k-ft	-	**-**
Flexural Analysis (Weak Axis)	2	0.018 k-ft	14.197 k-ft	-	**-**
Shear Analysis (Major Axis y)	2	0.838 k	41.4 k	0.02	**Pass**
Shear Analysis (Minor Axis z)	2	0.036 k	75.737 k	0.000	**Pass**
Bending & Axial Interaction Check (UC Bending Max)	2	-	-	0.388	**Pass**

Detail Report: M16 **Unity Check:** 0.387 (LC 2) **Load Combination:** Envelope

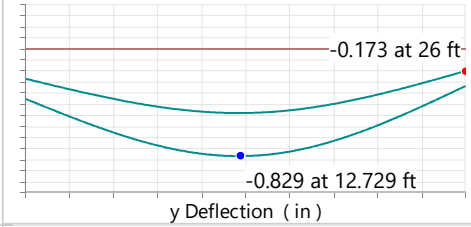


Input Data:

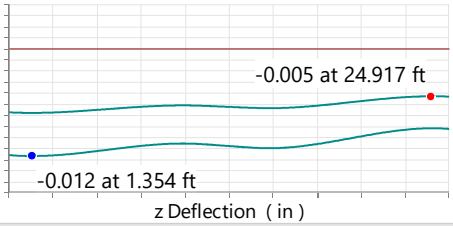
Shape:	W8X21	**I Node:**	N12
Member Type:	Beam	**J Node:**	N24
Length (ft):	26	**I Release:**	Fixed
Material Type:	Hot Rolled Steel	**J Release:**	Fixed
Design Rule:	Typical	**I Offset (in):**	N/A
Number of Internal Sections:	97	**J Offset (in):**	N/A



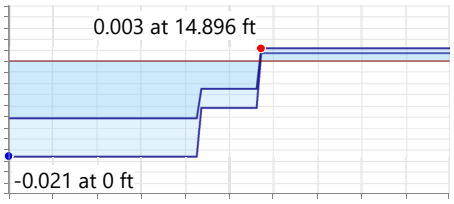
Diagrams:



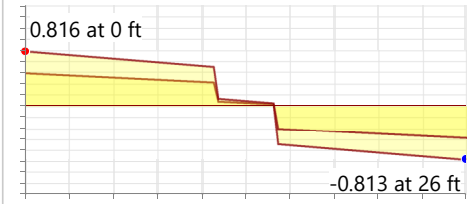
y Deflection (in)



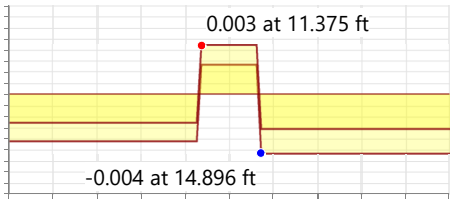
z Deflection (in)



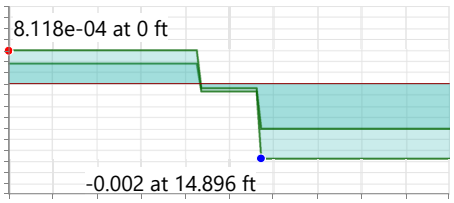
Axial Force (kips)



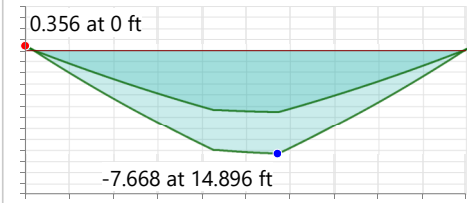
y Shear Force (kips)



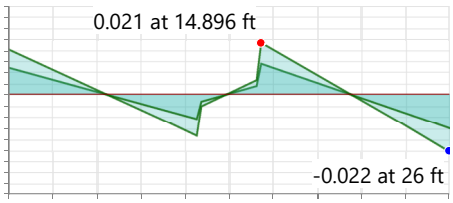
z Shear Force (kips)



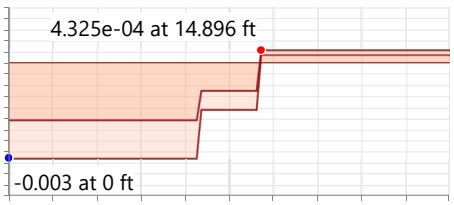
Torsion (kip-ft)



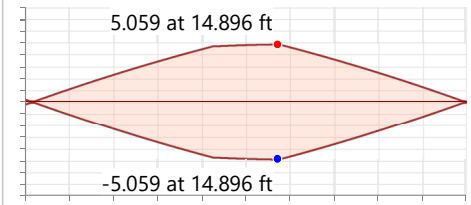
z-z Moment (kip-ft)



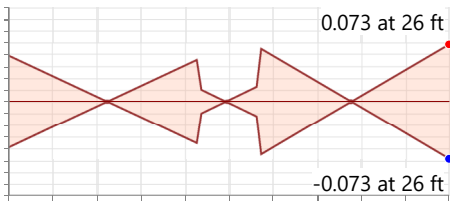
y-y Moment (kip-ft)



Axial Stress (ksi)



Bending Strong Stress (ksi)



Bending Weak Stress (ksi)

AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	2	-	-	-	-
Applied Loading - Shear + Torsion	2	-	-	-	-
Axial Tension Analysis	2	0.000 k	184.431 k	-	-
Axial Compression Analysis	2	0.003 k	15.086 k	-	-

Flexural Analysis (Strong Axis)	2	7.668 k-ft	19.913 k-ft	-	**-**
Flexural Analysis (Weak Axis)	2	0.021 k-ft	14.197 k-ft	-	**-**
Shear Analysis (Major Axis y)	2	0.816 k	41.4 k	0.02	**Pass**
Shear Analysis (Minor Axis z)	2	0.007 k	75.737 k	0.000	**Pass**
Bending & Axial Interaction Check (UC Bending Max)	2	-	-	0.387	**Pass**

IV. – CONNECTION DESIGN

PROJECT: MCC - Longview
PROJECT NO.: 21004
NAME: H. JONES
DATE: 12/16/21

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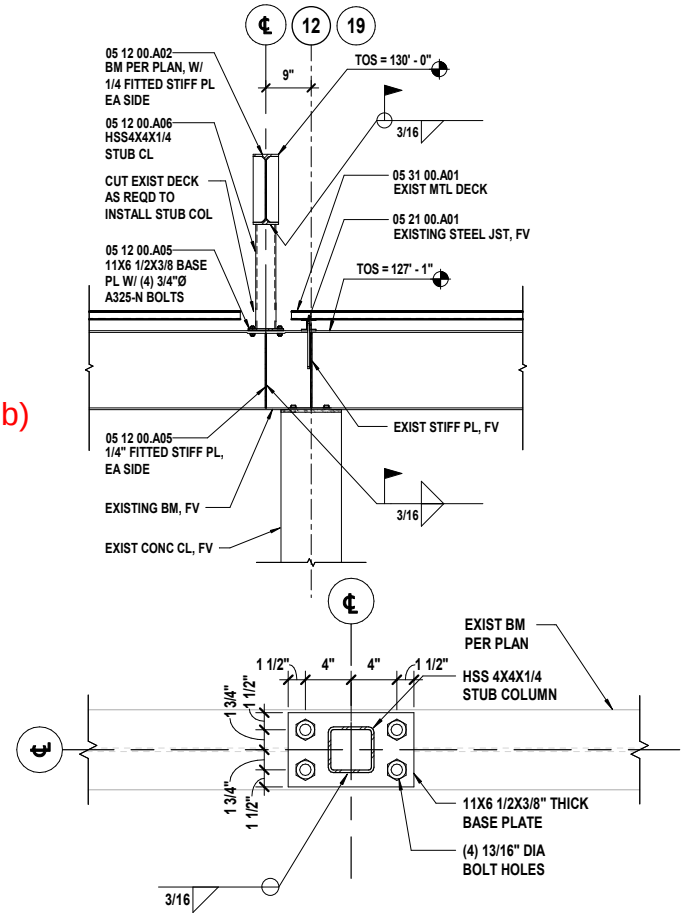
Stub Column Weld Check

Rn/Ω = (0.928 kip/in)*D*l (AISC eq. 8-2b)

Rn = (2.0)(0.928)(3)(4") = 22.3 kip -> OK



Stub Column Base Plate Thickness

tmin = l*sqrt(1.67*2*Pa/Fy*B*N) (AISC eq 14-7b)

l = larger of m, n, & λn'

Pa = 1.9kip
N = 11" B = 6.5"
bf = 4" d = 4"

m = 11"-0.95*4"/2 = 3.6" (AISC eq 14-2)
n = 6.5"-0.8*4"/2 = 1.65" (AISC eq 14-3)
n' = sqrt(4*4")/4 = 1" (AISC eq 14-4)
λ = 1 (conservative)

l = 3.6"

tmin = 3.6*sqrt(1.67*2*1.9kip/35ksi*6.5*11) = 0.181" -> 3/16" plate OK

Stub Column Base Plate Bolts

A325-N 3/4" DIA Bolts
Available Shear 11.9 kip (AISC Table 7-1)
Available Tensile 19.9 kip (AISC Table 7-2)

Max Shear Reaction : 1.4 kip -> OK
Max Moment Reaction : 1.9 kip-ft
Tension/bolt : [1.9 kip-ft/(3.5"/12in/ft)]/2 = 3.26 kip/bolt -> OK

PROJECT: MCC - Longview
PROJECT NO.: 21004
NAME: H. JONES
DATE: 12/16/21

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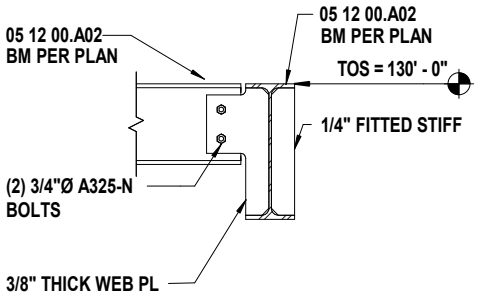
Beam to Beam Connection



A325-N 3/4" DIA Bolts
Available Shear 11.9 kip (AISC Table 7-1)
Available Tensile 19.9 kip (AISC Table 7-2)

Max Shear Reaction : 0.837 kip -> OK
Max Moment Reaction : 0.37 kip-ft
Tension/bolt : [0.37 kip-ft/(3"/12in/ft)] = 1.48 kip/bolt -> OK

Block Shear

W8x21, 3/8" Thick Web

Fy = 50ksi
Fu = 65ksi
Anv = 1.5"*2*3/8" = 1.125in^2
Ant = 3"*3/8" = 1.125in^2
Agv = 1.125in^2-(13/16"*3/8") = 0.82in^2
Ubs = 1

Rn/Ω = 0.6*65ksi*1.125in^2 + 1*65ksi*1.125in^2 = 117 kip (AISC J4-5)
<= 0.6*50ksi*0.82in^2 + 1*50ksi*1.125in^2 = 80.85 kip

Rn = 2.0*80.85 kip -> OK